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June 26, 2006

VIA FACSIMILE
EXPEDITED PROCEDURE

To: Examiner Carolyn Smith
Group Art Unit No. 1631
U. S. P. T. O.

Facsimile No. 571-273-8300

From: Phillip E. Miller

Facsimile No. 703-761-2375

Re: Filing of Appellant's Second Brief on Appeal
U. S. Patent Application Serial No. 09/870,009
Our Ref: YOR.418

Dear Examiner:

Enclosed please find Appellant's Second Brief on Appeal in the above-identified Application.

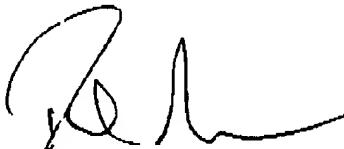
Thank you in advance for your kind consideration of this case.

Very truly yours,



Phillip E. Miller

PEM/sb
Enclosure

TRANSMITTAL OF APPEAL BRIEF (Large Entity)					Docket No. JP920000069US1				
In Re Application Of: Hisashi Kashima									
Application No. 09/870.009	Filing Date May 30, 2001	Examiner Carolyn Smith	Customer No. 21254	Group Art Unit 1631	Confirmation No. 8419				
Invention NUCLEOTIDE SEQUENCE FOR IDENTIFYING A SOURCE OF GENETIC INFORMATION, AND DNA AND CELL INCLUDING THE SAME									
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<u>COMMISSIONER FOR PATENTS:</u> Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on The fee for filing this Appeal Brief is: \$500.00 <i>(Already Paid. No Fee Due)</i> <input type="checkbox"/> A check in the amount of the fee is enclosed. <input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account. <input checked="" type="checkbox"/> The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 50-0510 <input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="width: 40%;">  _____ <i>Signature</i> </div> <div style="width: 40%; text-align: right;"> Dated: <i>June 26, 2006</i> </div> </div> <div style="margin-top: 10px;"> Phillip E. Miller, Reg. No. 46,060 McGinn IP Law Group, PLLC 8321 Old Courthouse Road, Suite 200 Vienna, VA 22182 703-761-4100 Customer No. 21254 </div>									
CC:			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;"> I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on _____ (Date) </td> </tr> <tr> <td style="padding: 5px;"> _____ Signature of Person Mailing Correspondence </td> </tr> <tr> <td style="padding: 5px;"> _____ Typed or Printed Name of Person Mailing Correspondence </td> </tr> </table>				I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on _____ (Date)	_____ Signature of Person Mailing Correspondence	_____ Typed or Printed Name of Person Mailing Correspondence
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JUN 26 2006

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09/870,009
JP920000069US1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Kashima et al.

Serial No.: 09/870,009 Group Art Unit: 1631
Filed: May 30, 2001 Examiner: Carolyn L. Smith

For: NUCLEOTIDE SEQUENCE FOR IDENTIFYING A SOURCE OF GENETIC
INFORMATION, AND DNA AND CELL INCLUDING THE SAME

Honorable Commissioner of Patents
Alexandria, VA 22313-1450

APPELLANT'S SECOND BRIEF ON APPEAL

Sir:

Comes now the Appellant and in response to the Office Action dated January 24, 2006 in which the Examiner REOPENED PROSECUTION, files his Second Brief on Appeal.

Appellant respectfully appeals the rejection of claims 5, 8-12, 15, 17-27 and 30-34 in the Office Action dated January 24, 2006. This Application has been twice rejected.

A Second Notice of Appeal was filed herein on April 24, 2006.

I. REAL PARTY IN INTEREST

The real party in interest is International Business Machines Corporation, assignee of 100% interest of the above-referenced patent application.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant, Appellant's legal representative or Assignee which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

09/870,009
JP920000069US1

III. STATUS OF CLAIMS

Claims 5, 8-12, 15, 17-27 and 30-34 are all the claims presently pending in the application, and are set forth fully in the attached Appendix. Claims 1-4, 6-7, 13-14, 16 and 28-29 have been canceled.

Claim 32 stands rejected under 35 U.S.C. § 112, first paragraph as allegedly failing to comply with the written description requirement.

Claims 8-10 stand rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite.

Claims 5, 8-12, 15, 17-27 and 30-34 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Lizardi (U. S. Patent No. 5,854,033).

Claims 5, 8-12, 15, 17-27, 30 and 34 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Arnot et al. ("Digital codes from hypervariable tandemly repeated DNA sequences in the *Plasmodium falciparum* circumsporozoite gene can genetically barcode isolates", *Molecular and Biochemical Parasitology*, vol. 61, 1993).

Appellant respectfully appeals these rejections of claims 5, 8-12, 15, 17-27 and 30-34.

IV. STATEMENT OF AFTER-FINAL AMENDMENTS

Appellant notes that the Notice of Appeal was filed herein in response to the Office Action of January 24, 2006 in which the Examiner reopened prosecution in response to Appellant's First Appeal Brief filed on October 31, 2005.

Thus, there are no After-Final Amendments that have not been entered in this Application.

Appellant notes that the pending claims are included in the Appendix attached hereto

V. SUMMARY OF THE INVENTION

The claimed invention (e.g., as recited in **independent claim 5**) is directed to DNA having embedded information. The DNA includes a gene portion including a predetermined gene, a portion which is other than the gene portion, and a nucleotide sequence which is not naturally occurring in the DNA and which is embedded in the portion which is other than the gene portion, and includes source identification information which identifies a source of the

09/870,009
JP920000069US1

predetermined gene in the gene portion (Application at Figure 3; page 11, lines 2-21).

The claimed invention (e.g., as recited in **independent claim 8**) is directed to DNA which includes at least one special sequence which is not naturally occurring in the DNA and that is intentionally designed and is included as a part of a nucleotide sequence. The at least one special sequence comprises source identification information which identifies the source of a predetermined gene which is included in a gene portion of the DNA, and the at least one special sequence is embedded in the DNA (Application at Figure 3; page 11, lines 2-21).

The claimed invention (e.g., as recited in **independent claim 11**) is directed to a nucleotide sequence in DNA, which includes source identification information which identifies a source of a predetermined gene in a gene portion of the DNA. The information is embedded in the DNA and is not naturally occurring in the DNA (Application at Figure 3; page 11, lines 2-21).

The claimed invention (e.g., as recited in **independent claim 12**) is directed to a cell in an organism, the cell having DNA which includes a gene portion including a predetermined gene, a portion which is other than the gene portion, and a nucleotide sequence which is not naturally occurring in the DNA and which is embedded in the portion other than the gene portion, and comprises source identification information which identifies a source of the predetermined gene in the gene portion (Application at Figure 3; page 11, lines 2-21).

The claimed invention (e.g., as recited in **independent claim 15**) is directed to DNA which includes a first portion comprising a predetermined gene, a second portion which is other than the first portion, and at least one nucleotide sequence which is not naturally occurring in the DNA and is embedded in the second portion, and which identifies a source of the predetermined gene in the first portion (Application at Figure 3; page 11, lines 2-21).

Conventional DNA may include a value-added gene embedded therein, in order to improve the characteristics of the organism having the DNA. However, such conventional DNA does not include any information therein to determine **the source of the value-added gene embedded therein**. Since DNA having such a value-added gene is easily copied, it is difficult to apply technical restrictions to the copying, by third parties, of value-added genes.

The claimed invention, on the other hand (e.g., as recited, for example, in claim 5),

09/870,009
JP920000069US1

includes DNA having a nucleotide sequence which is not naturally occurring in the DNA and which is embedded in the portion which is other than the gene portion, and includes source identification information which identifies a source of the predetermined gene in the gene portion (Application at Figure 3; page 11, lines 2-21). This nucleotide sequence may be used to identify the source of genetic information, for example, when the DNA is copied by a third party. Therefore, the claimed invention helps to prevent illegal copying of such genetic information (e.g., a value-added gene).

For example, assume that ACME Corporation bioengineers a new gene which may improve the speed or endurance of a racehorse. ACME Corp. may embed that gene (a "value-added" gene) in the DNA of a racehorse, so that the offspring of that racehorse may include that gene. Of course, ACME Corp. could make a fortune by marketing these racehorses that have this gene and, therefore, ACME Corp. will likely want to prevent others from copying the gene.

However, identifying copies of this gene may be difficult conventionally because it is hard to distinguish copying from gene mutation (Application at page 3, lines 8-12). That is, just because a racehorse has the gene does not mean that the bioengineered gene from ACME was copied, since the gene may have occurred in that racehorse by a genetic mutation.

However, using the claimed invention, ACME Corp. could also embed in the racehorse's DNA, a nucleotide sequence (e.g., a watermark sequence) identifying ACME Corp. as the source of the gene. Whenever ACME's gene is copied, this watermark sequence (identifying ACME as the source of the gene) may be copied as well. Thus, if the gene occurs in a racehorse, it may be easy to determine whether it occurred by copying the gene bioengineered by ACME Corp. by **determining whether the watermark sequence also occurs in the racehorse's DNA**. That is, if the watermark is present in the DNA, the gene was likely copied, but if no watermark is present in the DNA the gene may have occurred by genetic mutation (Application at page 13-20).

VI. GROUNDS OF REJECTION TO BE REVIEWED

The grounds of rejection to be reviewed by the Board of Patent Appeals and Interferences include:

09/870,009
JP920000069US1

- 1) whether claim 32 satisfies the written description requirement under 35 U.S.C. § 112, first paragraph; and
- 2) whether claims 8-10 are not indefinite under 35 U.S.C. § 112, second paragraph; and
- 3) whether claims 5, 8-12, 15, 17-27 and 30-34 are unpatentable under 35 U.S.C. § 102(b) over Lizardi (U. S. Patent No. 5,854,033).
- 4) whether claims 5, 8-12, 15, 17-27, 30 and 34 are unpatentable under 35 U.S.C. § 102(b) over Arnot et al. ("Digital codes from hypervariable tandemly repeated DNA sequences in the *Plasmodium falciparum* circumsporozoite gene can genetically barcode isolates", *Molecular and Biochemical Parasitology*, vol. 61, 1993).

VIII. ARGUMENT

A. The Rejection of Claim 32 under 35 U.S.C. §112, First Paragraph

The Examiner rejects claim 32 under 35 U.S.C. §112, first paragraph as allegedly failing to comply with the written description requirement. Appellant submits, however, that claim 32 fully complies with the written description requirement.

Specifically, on pages 3-4 of the Office Action dated January 24, 2006, the Examiner alleges:

"... page 13, lines 3-6, of the specification, states 'a gene portion wherein a protein code sequence and its transcription control information are stored, and a portion wherein genetic information is not included'. This statement does not provide written support for the 'portion which is other than said gene portion' mentioned in new claim 32 because this portion on page 13 merely states that genetic information is not included. 'Genetic information' and 'protein code sequence and its transcription code information' differ in scope"

Further, in the Advisory Action dated August 15, 2005, the Examiner alleged:

" It is noted that 35 USC 112, first paragraph, also requires written description of the invention wherein all limitations of the instant claims are fully and completely supported by the specification (sic), drawings, and claims, as originally filed. Applicants cite pages 12, line 24 to page 13, line 6 of the specification. Applicants state they have defined a gene portion in an exemplary aspect. It is noted that examples do not provide clear and concise definitions of a term or phrase. Applicants argue that one of skill in the art would assume and reasonably conclude that a portion other than a gene portion is a portion "which does not store a protein code sequence and transcription control information for said sequence". This statement is

09/870,009
JP920000069US1

found unpersuasive as Applicants did not specifically state in clear and concise definitions (sic) what is and is not considered to be a genetic portion and other portion. Negative limitations must be fully supported by the original disclosure. And since there is a lack of clear and concise definitions, one of skill in the art would not know what to reasonably assume. One of skill in the art would be confused by the statement of "a portion wherein genetic information is not included" as stated in the specification on page 13, because by containing nucleotides automatically means it contains genetic information, in the broad and reasonable interpretation of "genetic information."

However, Appellants would point out that, as noted in MPEP §2163, to satisfy the written description requirement, a patent specification need only describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention (e.g., *Moba, B.V. v. Diamond Automation, Inc.*, 325 F.3d 1306, 1319, 66 USPQ2d 1429, 1438 (Fed. Cir. 2003); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d at 1563, 19 USPQ2d at 1116). Further, Applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997).

Further, possession may be shown in a variety of ways including description of an actual reduction to practice, or by showing that the invention was "ready for patenting" such as by the disclosure of drawings or structural chemical formulas that show that the invention was complete, or by describing distinguishing identifying characteristics sufficient to show that the applicant was in possession of the claimed invention. See, e.g., *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 68, 119 S.Ct. 304, 312, 48 USPQ2d 1641, 1647 (1998); *Eli Lilly*, 119 F.3d at 1568, 43 USPQ2d at 1406; *Amgen, Inc. v. Chugai Pharmaceutical*, 927 F.2d 1200, 1206, 18 USPQ2d 1016, 1021 (Fed. Cir. 1991)

In this case, it is completely unreasonable to suggest that the specification does not describe the claimed invention of claim 32 in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. Indeed, Claim 32 recites "*wherein said portion which is other than said gene portion comprises a portion of said DNA which does not store a protein code sequence and transcription control*

09/870,009
JP920000069US1

information for said sequence".

The Application states, for example:

"The form of the genetic information in a cell will now be described through an explanation of the overview of a process by which [a] gene codes for a protein molecule ... Arranged in the DNA are four bases, A (adenine), T (thymine), G (guanine) and C (cytosine). This sequence of the four bases (hereinafter the bases are referred to by their initials, A, T, G and C) of DNA consists of a gene portion wherein a protein code sequence and its transcription control information are stored, and a portion wherein genetic information is not included" (Application at page 12, line 24-page 13, line 6) (emphasis added).

That is, the Application defines a gene portion (e.g., in an exemplary aspect) as a portion where a protein code sequence and its transcription control information are stored. Thus, one of ordinary skill in the art would likely assume **and it is reasonable to conclude that a portion other than a gene portion is a portion "which does not store a protein code sequence and transcription control information for said sequence"**, as recited in claim 32.

Thus, Appellant respectfully submits that one of ordinary skill in the art would likely be able to read the specification and easily make and use the claimed invention of claim 32. Therefore, the Examiner has clearly failed to establish that claim 32 does not comply with the written description requirement under 35 U.S.C. §112, first paragraph.

Therefore, the Board is respectfully requested to withdraw this rejection.

B. The Rejection of Claims 8-10 under 35 U.S.C. §112, Second Paragraph

The Examiner rejects claims 8-10 under 35 U.S.C. §112, second paragraph as allegedly being indefinite. Appellant submits, however, that claims 8-10 are not indefinite.

Specifically, the Examiner alleges that the phrase "intentionally designed" is "vague and indefinite". The Examiner alleges that "it is unclear what is considered to be an unintentionally designed" nucleic acid.

09/870,009
JP920000069US1

Claim 8 recites

"DNA comprising:

*at least one special sequence which is not naturally occurring in said DNA
and that is intentionally designed and is included as a part of a nucleotide sequence,
wherein said at least one special sequence comprises source identification
information which identifies the source of a predetermined gene which is included in a gene
portion of said DNA, and
wherein said at least one special sequence is embedded in said DNA."*

With respect to the phrase "unintentionally designed" Appellant notes that this phrase is not included in claim 8. Therefore, it is clearly unreasonable for the Examiner to reject claim 8 based on an alleged indefiniteness in this phrase.

With respect to the phrase "intentionally designed", Appellant notes that the Examiner has given Appellant at least 6 Office Actions (January 27, 2003, July 11, 2003, April 13, 2004, June 8, 2004, December 3, 2004, and May 9, 2005). However, in none of these Office Actions did Examiner ever indicate to Appellant that the phrase "intentionally designed" was unclear to Examiner.

Further, MPEP 2173.02 provides that the Examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph, is **whether the claim meets the threshold requirements of clarity and precision**, not whether more suitable language or modes of expression are available. Further, MPEP 2173.02 provides that **some latitude in the manner of expression and the aptness of terms should be permitted** even though the claim language is not as precise as the Examiner might desire.

The essential inquiry pertaining to this requirement is whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Definiteness of claim language must be analyzed, not in a vacuum, but in light of:

(A) The content of the particular application disclosure;

09/870,009
JP920000069US1

(B) The teachings of the prior art; and

(C) The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

In reviewing a claim for compliance with 35 U.S.C. 112, second paragraph, the examiner must **consider the claim as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope** and, therefore, serves the notice function required by 35 U.S.C. 112, second paragraph, by providing clear warning to others as to what constitutes infringement of the patent. See, e.g., *Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 1379, 55 USPQ2d 1279, 1283 (Fed. Cir. 2000). Only if the language of the claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement, is a rejection of the claim under 35 U.S.C. 112, second paragraph appropriate. See *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470, 28 USPQ2d 1190, 1195 (Fed. Cir. 1993).

Appellant respectfully submits that claim 8 clearly **meets the threshold requirements of clarity and precision**, especially if Appellant is given some latitude in the manner of expression and the aptness of terms.

Moreover, Appellant respectfully submits that the term "**intentionally designed**" is used in claim 8 with "not naturally occurring" to distinguish the "at least one special sequence" from a naturally occurring sequence in DNA. Indeed, Appellant respectfully submits that one of ordinary skill in the art would likely consider the term "*not naturally occurring in said DNA and that is intentionally designed*" to mean a sequence which may be **intentionally designed by man**, as opposed to a naturally-occurring sequence in DNA (e.g., a sequence that is designed without any human intervention).

Further, the term is used to describe the "at least one special sequence" that includes "source identification information". In an exemplary aspect of the claimed invention, such a sequence may be referred to as a "watermark sequence". Such a sequence is clearly described in the Application, for example, at page 11, lines 2-21 and Figure 3.

Further, as with other "watermarks" (e.g., a digital watermark in software or an electronic document, etc.), in an exemplary aspect of the claimed invention, the "watermark sequence" may be embedded into DNA to help identify the source of a "value-added gene".

09/870,009
JP920000069US1

Therefore, Appellant respectfully submits that when the definiteness of claim 8 is analyzed in light of the content of the Application disclosure, the teachings of the prior art, and the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made, the term "intentionally designed" is clear and not indefinite".

Thus, Appellant respectfully submits that one of ordinary skill in the art would likely consider claim 8 (and claims 9-10 which depend therefrom) to be clearly defined and not indefinite. Therefore, the Examiner has clearly failed to establish that claims 8-10 are indefinite under 35 U.S.C. §112, first paragraph.

Therefore, the Board is respectfully requested to withdraw this rejection.

C. The Rejection of claims 5, 8-12, 15, 17-27 and 30-34 under 35 U.S.C. § 102(b) over Lizardi

As set forth on pages 6-8 of the Office Action dated January 24, 2006, the Examiner rejected claims 5, 8-12, 15, 17-27 and 30-34 under 35 U.S.C. § 102(b) over Lizardi.

Specifically, the Examiner alleges that Lizardi discloses an open circle probe (col. 22, lines 20-37) with detection tags which "represents a first gene portion including a predetermined gene for Huntington's chorea, a second portion which is other than said gene portion (=probe), and a not naturally occurring nucleotide sequence (=detection tag) which is embedded in (sic) portion other than said gene portion with source identification information of said predetermined gene" (Office Action at page 6). The Examiner further alleges that "Lizardi discloses DNA ligation which circularizes a specially designed nucleic acid probe ... which represents a special sequence that is intentionally designed and included as part of the nucleotide sequence" (Office Action at page 6).

1. Independent claim 5

Independent claim 5 recites:

*"DNA having embedded information, comprising:
a gene portion including a predetermined gene;*

09/870,009
JP920000069US1

*a portion which is other than said gene portion; and
a nucleotide sequence which is not naturally occurring in said DNA and which is
embedded in said portion which is other than said gene portion, and comprises source
identification information which identifies a source of said predetermined gene in said
gene portion"* (emphasis added)

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law.

Specifically, the Examiner alleges that Lizardi teaches the claimed invention. Appellant submits, however, that there are features of the claimed invention that are not taught or suggested by Lizardi.

Lizardi discloses compositions for amplifying nucleic acid sequences used to detect specific nucleic acids in a sample with high specificity and sensitivity (Lizardi at Abstract).

However, contrary to the Examiner's allegations, Lizardi does not teach or suggest "*a nucleotide sequence which is not naturally occurring in said DNA and which is embedded in said portion which is other than said gene portion, and comprises source identification information which identifies a source of said predetermined gene in said gene portion*", as recited in claims 5 and 12 and similarly recited in claims 8, 11, and 15.

As noted above, in an exemplary aspect of the claimed invention, this nucleotide sequence may be used to identify the source of genetic information, for example, when the DNA is copied by a third party. Therefore, the claimed invention helps to prevent illegal copying of such genetic information (e.g., a value-added gene).

Clearly, this feature not taught or suggested by Lizardi. Indeed, as noted above, the purpose of Lizardi is to provide an improved method for detecting specific nucleic acids in a sample with high specificity and sensitivity. Lizardi has nothing to do with identifying a source of genetic information (e.g., identifying a source of a value added gene).

Specifically, Lizardi teaches a method which includes 1) a DNA ligation operation, 2) an amplification operation, and 3) a detection operation. Lizardi states that the method has two features that "provide simple, quantitative, and consistent amplification and detection of a target nucleic acid sequence. First, target sequences are amplified via a small diagnostic

09/870,009
JP920000069US1

probe Second, amplification takes place not in cycles, but in a continuous, isothermal replication: rolling circle replication" (Lizardi at col. 2, lines 52-55; col. 3, lines 24-34)

Lizardi discloses at Figure 5, the open circle probe (OCP) which is a linear single-stranded DNA molecule containing preferably 70 to 100 nucleotides (Lizardi at col. 5, lines 22-25. The OCP includes portions such as the "detection tag portion".

The OCP is ligated and replicated to form a long DNA molecule (TS-DNA) containing multiple repeats of sequences complementary to the OCP which are called "target sequences" (Lizardi at col. 5, lines 55-67). Each end of the OCP includes a "target probe portion" which is 10 to 35 nucleotides and is complementary to a target nucleic acid sequence (Lizardi at col. 6, lines 12-24). For example, Figure 1 illustrates an OCP hybridized to a target sequence.

Lizardi teaches that in a ligation operation, an OCP hybridizes to its cognate target nucleic acid sequence (if present) followed by ligation of the ends of the hybridized OCP to form a covalently closed, single stranded OCP. After ligation, a rolling circle replication primer hybridizes to OCP molecules followed by rolling circle replication of the circular OCP molecules (Lizardi at col. 19, lines 32-41).

Lizardi teaches that multiplex rolling circle amplification (RCA) can be used to detect mutations in genes where numerous distinct mutations are associated with a certain disease (e.g., Huntington's chorea) (Lizardi at col. 22, lines 20-22). Lizardi teaches that the presence of one or more members of a group of target sequences may be detected by designing an OCP for each target sequence, where the target probe portions of each open circle probe are different but the sequence of the primer portions and the sequence of the detection tag portions of all the OCPs are the same. All of the OCPs are placed in the same OCP-target sample mixture and the same primer and detection probe are used to amplify and detect TS-DNA (Lizardi at col. 22, lines 28-40). If any of the target sequences are present in the target sample, the OCP for that target will be ligated into a circle and the circle will be amplified to form TS-DNA (Lizardi at col. 22, lines 40-42). Detection of TS-DNA resulting from ligation of any of the OCPs indicates that at least one member of the target sequence group is present in the target sample (Lizardi at col. 22, lines 46-48).

Thus, using the Lizardi method, OCPs may be mixed with a target sample to

09/870,009
JP920000069US1

determine whether the target sample includes a target nucleotide sequence. This is completely unrelated to the claimed invention.

Indeed, the Examiner surprisingly attempts to equate the gene for Huntington's chorea with the "predetermined gene" in the claimed invention. The Examiner also attempts to equate the "probe" (presumably the open circle probe (OCP) in Lizardi with "a second portion which is other than said gene portion", and attempts to equate the "detection tag" in Lizardi with the "nucleotide sequence which is not naturally occurring in said DNA" in the claimed invention.

Thus, the Examiner is confusingly alleging that Lizardi discloses DNA that includes 1) a gene portion including the Huntington's chorea gene, and 2) the open circle probe (OCP). However, nowhere does Lizardi teach or suggest DNA that includes the gene for Huntington's chorea and the OCP. Instead, Lizardi teaches that the OCP may be used to replicate a target sequence to detect a gene for Huntington's chorea in a sample mixture.

Further, the Examiner surprisingly attempts to equate the "detection tag" in Lizardi with the "nucleotide sequence which is not naturally occurring in said DNA" of the claimed invention. However, Appellant would point out that in the claimed invention, this "nucleotide sequence" may include a watermark sequence which identifies "a source of said predetermined gene in said gene portion". For example, as noted in the racehorse example above, the watermark sequence may identify the source of the gene found in the DNA of a racehorse as ACME Corporation.

However, nowhere does Lizardi teach or suggest that the "detection tag" may identify the source of the Huntington's chorea gene. Indeed, nowhere does Lizardi teach or suggest that the detection tag may be used to identify ACME Corp. as the source of the Huntington's chorea gene.

Therefore, the Examiner's allegations are completely unreasonable.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every feature of the claimed invention. Therefore, the Board is respectfully requested to withdraw this rejection.

09/870,009
JP920000069US1

2. Independent Claim 8

Independent claim 8 recites:

"DNA comprising:

at least one special sequence which is not naturally occurring in said DNA and that is intentionally designed and is included as a part of a nucleotide sequence,

wherein said at least one special sequence comprises source identification information which identifies the source of a predetermined gene which is included in a gene portion of said DNA, and

wherein said at least one special sequence is embedded in said DNA" (emphasis added)

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere does Lizardi teach or suggest *"wherein said at least one special sequence comprises source identification information which identifies the source of a predetermined gene which is included in a gene portion of said DNA"* as recited in claim 8.

Appellant notes that these features are similar to the features discussed above with respect to claim 5. Therefore, Appellant's arguments made above with respect to claim 5 are incorporated by reference herein.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 8.

Therefore, the Board is respectfully requested to withdraw this rejection.

3. Independent claim 11

Independent claim 11 recites:

"A nucleotide sequence in DNA, comprising:

source identification information which identifies a source of a predetermined gene in a gene portion of said DNA,

wherein said information is embedded in said DNA and is not naturally occurring in said DNA" (emphasis added).

09/870,009
JP920000069US1

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, Lizardi clearly does not teach or suggest "*source identification information which identifies a source of a predetermined gene in a gene portion of said DNA*" as recited in claim 11.

Appellant notes that these features are similar to the features discussed above with respect to claim 5. Therefore, Appellant's arguments made above with respect to claim 5 are incorporated by reference herein.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 11.

Therefore, the Board is respectfully requested to withdraw this rejection.

4. Independent Claim 12

Independent claim 12 recites:

"A cell in an organism, said cell having DNA comprising:

a gene portion including a predetermined gene;

a portion which is other than said gene portion; and

a nucleotide sequence which is not naturally occurring in said DNA and which is embedded in said portion other than said gene portion, and comprises source identification information which identifies a source of said predetermined gene in said gene portion"
(emphasis added)

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, Lizardi clearly does not teach or suggest "*a nucleotide sequence which is not naturally occurring in said DNA and which is embedded in said portion other than said gene portion, and comprises source identification information which identifies a source of said predetermined gene in said gene portion*" as recited in claim 12.

Appellant notes that these features are similar to the features discussed above with respect to claim 5. Therefore, Appellant's arguments made above with respect to claim 5 are

09/870,009
JP920000069US1

incorporated by reference herein.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 12.

Therefore, the Board is respectfully requested to withdraw this rejection.

5. Independent Claim 15

Independent claim 15 recites:

"DNA comprising:

a first portion comprising a predetermined gene;

a second portion which is other than said first portion; and

at least one nucleotide sequence which is not naturally occurring in said DNA and is embedded in said second portion, and which identifies a source of said predetermined gene in said first portion" (emphasis added)

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, Lizardi clearly does not teach or suggest *"at least one nucleotide sequence which is not naturally occurring in said DNA and is embedded in said second portion, and which identifies a source of said predetermined gene in said first portion"* as recited in claim 15.

Appellant notes that these features are similar to the features discussed above with respect to claim 5. Therefore, Appellant's arguments made above with respect to claim 5 are incorporated by reference herein.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 15.

Therefore, the Board is respectfully requested to withdraw this rejection.

6. Dependent Claim 9

Claim 9 depends from claim 8 and further recites *"wherein said at least one special sequence comprises a plurality of sequences embedded at predetermined locations of said DNA"*. This feature is discussed in the present Application at page 8, lines 6-16; page 26,

09/870,009
JP920000069US1

line 14-page 27, line 12.

The Examiner asserts that this feature is disclosed by Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 9. Therefore, the Board is respectfully requested to withdraw this rejection.

7. Dependent Claim 10

Claim 10 depends from claim 8, and further recites "*wherein said at least one special sequence comprises a plurality of sequences having a plurality of types of patterns embedded at predetermined locations of said DNA*". This feature is discussed in the present Application at page 8, lines 6-16; page 26, line 14-page 27, line 12.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 10. Therefore, the Board is respectfully requested to withdraw this rejection.

8. Dependent Claim 17

Claim 17 depends from claim 15 and further recites "*wherein said predetermined gene comprises a value-added gene that is provided by one of selective breeding, cultivation, and gene manipulation*". This feature is discussed in the present Application at page 11, lines 9-12.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere

18

09/870,009
JP920000069US1

else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 17. Therefore, the Board is respectfully requested to withdraw this rejection.

9. Dependent Claim 18

Claim 18 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence comprises a plurality of sequences having a plurality of types of patterns embedded at predetermined locations in said second portion*".

This feature is discussed in the present Application at page 8, lines 6-16; page 26, line 14-page 27, line 12.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 18. Therefore, the Board is respectfully requested to withdraw this rejection.

10. Dependent Claim 19

Claim 19 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence comprises a plurality of nucleotide sequences*". This feature is discussed in the present Application at page 8, lines 6-16; page 26, line 14-page 27, line 12.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 19. Therefore, the Board is respectfully requested to withdraw this rejection.

09/870,009
JP920000069US1

11. Dependent Claim 20

Claim 20 depends from claim 19 and further recites "*wherein said plurality of nucleotide sequences comprises different nucleotide sequences*". This feature is discussed in the present Application at page 8, lines 6-16; page 24, lines 6-19.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 20. Therefore, the Board is respectfully requested to withdraw this rejection.

12. Dependent Claim 21

Claim 21 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence is copy tolerant*". This feature is discussed in the present Application at page 14, lines 2-10.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 21. Therefore, the Board is respectfully requested to withdraw this rejection.

13. Dependent Claim 22

Claim 22 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence is embedded at a random location in said second portion*". This feature is discussed in the present Application at page 20, lines 6-14.

The Examiner asserts that this feature is disclosed in Lizardi.

09/870,009
JP920000069US1

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 22. Therefore, the Board is respectfully requested to withdraw this rejection.

14. Dependent Claim 23

Claim 23 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence and is not naturally generated through gene mutation*". This feature is discussed in the present Application at page 11, lines 9-21.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 23. Therefore, the Board is respectfully requested to withdraw this rejection.

15. Dependent Claim 24

Claim 24 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence comprises one of a restrictive enzyme identification sequence and a promoter*". This feature is discussed in the present Application at page 22, lines 15-21.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 24. Therefore,

21

09/870,009
JP920000069US1

the Board is respectfully requested to withdraw this rejection.

16. Dependent Claim 25

Claim 25 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence is detectable using a nucleotide sequence that is complementary to said at least one nucleotide sequence*". This feature is discussed in the present Application at page 29, lines 4-21.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 25. Therefore, the Board is respectfully requested to withdraw this rejection.

17. Dependent Claim 26

Claim 26 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence is embedded at a predetermined location in said second portion*". This feature is discussed in the present Application at page 16, lines 22-27.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 26. Therefore, the Board is respectfully requested to withdraw this rejection.

18. Dependent Claim 27

Claim 27 depends from claim 15 and further recites "*wherein said nucleotide*

09/870,009
JP920000069US1

sequence is correlated with said source identification information". This feature is discussed in the present Application at page 7, line 10-page 8, line 5.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 27. Therefore, the Board is respectfully requested to withdraw this rejection.

19. Dependent Claim 30

Claim 30 depends from claim 5 and further recites "*wherein said nucleotide sequence comprises a watermark sequence*". This feature is discussed in the present Application at page 11, lines 1-10.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 30. Therefore, the Board is respectfully requested to withdraw this rejection.

20. Dependent Claim 31

Claim 31 depends from claim 5 and further recites "*wherein said predetermined gene comprises a protein code sequence and transcription control information for said sequence*". This feature is discussed in the present Application at page 13, lines 1-16.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

09/870,009
JP920000069US1

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 31. Therefore, the Board is respectfully requested to withdraw this rejection.

21. Dependent Claim 32

Claim 32 depends from claim 5 and further recites "*wherein said portion which is other than said gene portion comprises a portion of said DNA which does not store a protein code sequence and transcription control information for said sequence*". This feature is discussed in the present Application at page 13, lines 1-16.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 32. Therefore, the Board is respectfully requested to withdraw this rejection.

22. Dependent Claim 33

Claim 33 depends from claim 5 and further recites "*wherein said predetermined gene comprises a gene which is produced by artificial, intentional manipulation*". This feature is discussed in the present Application at page 2, lines 4.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 33. Therefore, the Board is respectfully requested to withdraw this rejection.

23. Dependent Claim 34

09/870,009
JP920000069US1

Claim 34 depends from claim 5 and further recites "*wherein said gene portion is transcribed into RNA, and said portion other than said gene portion is not transcribed into RNA*". This feature is discussed in the present Application at page 13, lines 1-16.

The Examiner asserts that this feature is disclosed in Lizardi.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 34. Therefore, the Board is respectfully requested to withdraw this rejection.

D. The Rejection of claims 5, 8-11, 15, 17-27, 30 and 34 under 35 U.S.C. § 102(b) over Arnot

As set forth on pages 8-11 of the Office Action dated January 24, 2006, the Examiner rejected claims 5, 8-11, 15, 17-27, 30 and 34 under 35 U.S.C. § 102(b) over Arnot.

Specifically, the Examiner alleges that Arnot discloses DNA including CS gene of *Plasmodium falciparum* which the Examiner attempts to equate with a "predetermined gene" in the claimed invention (Office Action at page 8). The Examiner further attempts to equate the CS repeats with the "gene portion" of DNA in the claimed invention, and the "flanking region" in Arnot with the "portion which is other than said gene portion" in the claimed invention. Arnot further attempts to equate the CS region flanking primer with the "nucleotide sequence which is not naturally occurring in said DNA" of the claimed invention. The Examiner alleges that the flanking primer identifies a source of a predetermined gene.

1. Independent claim 5

Independent claim 5 recites:

"DNA having embedded information, comprising:

a gene portion including a predetermined gene;

a portion which is other than said gene portion; and

a nucleotide sequence which is not naturally occurring in said DNA and which is

09/870,009
JP920000069US1

embedded in said portion which is other than said gene portion, and comprises source identification information which identifies a source of said predetermined gene in said gene portion" (emphasis added)

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law.

Specifically, the Examiner alleges that Arnot teaches the claimed invention of claims 5, 8-11, 15, 17-27, 30 and 34. Appellant submits, however, that there are features of the claimed invention that are not taught or suggested by Arnot.

Arnot discloses "a strategy for the rapid extraction of information on tandem repeat sequence variation from hypervariable alleles, and apply it to the Plasmodium falciparum CS gene" (Arnot at Abstract) (By the way, Plasmodium falciparum is a protozoan parasite which causes human malaria). In the Arnot method, DNA was prepared from 5mls of cultured parasites (Arnot at page 16, col. 2). A polymerase chain reaction (PCR) was used to amplify 20-100 ng of the DNA, using 1-μM CS flanking primer, 1-μM TAG primer, 20 nM TAGed Type 1 or 2 SC repeat primer plus one unit of AmpliTaq, and the PCR products were loaded on a DNA sequencing-type gel (Arnot at page 17, col. 1). Figure 1 in Arnot illustrates the sequences of the variant tandem repeat primers and their binding sites on the Plasmodium falciparum CS gene.

However, contrary to the Examiner's allegations, Arnot does not teach or suggest "*a nucleotide sequence which is not naturally occurring in said DNA and which is embedded in said portion which is other than said gene portion, and comprises source identification information which identifies a source of said predetermined gene in said gene portion*", as recited in claims 5 and 12 and similarly recited in claims 8, 11, and 15.

As noted above, in an exemplary aspect of the claimed invention, this nucleotide sequence may be used to identify the source of genetic information, for example, when the DNA is copied by a third party. Therefore, the claimed invention helps to prevent illegal copying of such genetic information (e.g., a value-added gene).

Clearly, this feature not taught or suggested by Arnot. Indeed, the purpose of the Arnot method is to identify lineages of drug-resistant parasites, or to reconstruct local

09/870,009
JP920000069US1

networks of parasitic infections (Arnot at page 23, col. 1). Certainly, Arnot has nothing to do with the claimed invention which includes DNA having a nucleotide sequence which is not naturally occurring in the DNA and which is embedded in a portion which is other than a gene portion, and includes source identification information which identifies a source of the predetermined gene.

Indeed, as noted above, the Examiner surprisingly attempts to equate the CS gene of *Plasmodium falciparum* with a "predetermined gene" in the claimed invention, the CS repeats with the "gene portion" of DNA in the claimed invention, the "flanking region" in Arnot with the "portion which is other than said gene portion" in the claimed invention, and the CS region flanking primer with the "nucleotide sequence which is not naturally occurring in said DNA" of the claimed invention. The Examiner further alleges that the flanking primer identifies a source of a predetermined gene.

The Examiner's allegations are surprising and completely unreasonable.

First, Appellant would point out that the Arnot method deals with **bonding "repeat primers" onto the CS gene**. Indeed, this is clear from Figures 1 and 2 in Arnot which show the "binding sites" on the CS gene. In fact, nowhere does Arnot teach or suggest a "portion which is other than said gene portion" as in the claimed invention.

Further, in the claimed invention, the "nucleotide sequence" is "embedded in said portion which is other than said gene portion". The Examiner alleges that this is disclosed by the "flanking primer" in Arnot being allegedly "embedded" in the "flanking region" in Arnot.

This is absolutely ridiculous.

Indeed, the present Application states that in the claimed invention, a "nucleotide sequence" may be embedded in DNA "so that DNA including such a nucleotide sequence is distinguishable" (Application at page 11, lines 2-5). That is, the embedded nucleotide sequence may be referred to as a "watermark sequence". When the watermark sequence is embedded in DNA including a predetermined gene (e.g., a value-added gene), if the DNA including a value-added gene is copied during the breeding process, the source of the genetic information in the gene can be identified, and if the watermark sequence is detected in the DNA, it can be ascertained that the gene of the organism is a copy of the DNA wherein the watermark was previously embedded (Application at page 11, lines 9-21). (e.g., see Figures 8

09/870,009
JP920000069US1

and 9 of the present Application).

Thus, in light of the specification, Appellant respectfully submits that the term "embedded" may be construed to mean "embedded" such that if the DNA including a value-added gene is copied during the breeding process, the source of the genetic information in the gene can be identified, and if the watermark sequence is detected in the DNA, it can be ascertained that the gene of the organism is a copy of the DNA wherein the watermark was previously embedded. Nowhere is this taught or suggested by Amot.

Indeed, Appellant would point out that the Examiner is surprisingly alleging that the "flanking primer" which is bound to a "flanking region" of the CS gene is "embedded". Appellant respectfully submits that this is clearly contrary to the use of the term "embedded" in the present Application and contrary to the use of the term "embedded" by one of ordinary skill in the art.

In fact, Appellant would point out that the Examiner referred to a dictionary to construe the term "embedded" in claim 5. Clearly, the Examiner's analysis **directly contrary** to the decision in *Phillips v. AWH Corp.*, 415 F.3d.1301 (Fed. Cir. 2005) (en banc), in which the Federal Circuit concluded that intrinsic evidence, such as the claims, specification, and prosecution history, **is the most reliable evidence** by which a court can construe claim terms, whereas **extrinsic evidence, including dictionaries, is less reliable and should be used for limited purposes**. The Court confirmed that extrinsic evidence, including expert and inventor testimony, dictionaries, and learned treatises, "can shed useful light on the relevant art," but noted that **such evidence is "less significant" than intrinsic evidence for construing claims**. Id. at *18 (emphasis added; quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)).

Therefore, Appellant respectfully submits that the use of the term "embedded" in the present Application is clear and should be used to construe the terms of the claims. Clearly, therefore, Amot does not teach or suggest a nucleotide sequence which is not naturally occurring in said DNA and **which is embedded in said portion which is other than said gene portion**, and comprises source identification information which identifies a source of said predetermined gene in said gene portion.

Further, the Examiner alleges that the flanking primer identifies a source of a

09/870,009
JP920000069US1

predetermined gene (e.g., the CS gene). However, nowhere does Arnot teach or suggest that the flanking primer includes "source identification information". Indeed, the flanking primer is merely bound to the CS gene. The Examiner states that Arnot discloses the ability to trace malarial infection (Office Action at page 9). However, **nowhere does Arnot teach or suggest that a simple flanking primer (which is not "embedded" in DNA including the CS gene, by the way) which is bound to a CS gene can identify the source of the gene.**

Therefore, the Examiner's allegations are completely unreasonable.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every feature of the claimed invention. Therefore, the Board is respectfully requested to withdraw this rejection.

2. Independent Claim 8

Independent claim 8 recites:

"DNA comprising:

at least one special sequence which is not naturally occurring in said DNA and that is intentionally designed and is included as a part of a nucleotide sequence,

wherein said at least one special sequence comprises source identification information which identifies the source of a predetermined gene which is included in a gene portion of said DNA, and

wherein said at least one special sequence is embedded in said DNA" (emphasis added)

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere does Arnot teach or suggest *"wherein said at least one special sequence comprises source identification information which identifies the source of a predetermined gene which is included in a gene portion of said DNA"* as recited in claim 8.

Appellant notes that these features are similar to the features discussed above with respect to claim 5. Therefore, Appellant's arguments made above with respect to claim 5 are

09/870,009
JP920000069US1

incorporated by reference herein.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 8.

Therefore, the Board is respectfully requested to withdraw this rejection.

3. Independent claim 11

Independent claim 11 recites:

"A nucleotide sequence in DNA, comprising:

source identification information which identifies a source of a predetermined gene in a gene portion of said DNA,

wherein said information is embedded in said DNA and is not naturally occurring in said DNA" (emphasis added).

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, Arnot clearly does not teach or suggest "*source identification information which identifies a source of a predetermined gene in a gene portion of said DNA* " as recited in claim 11.

Appellant notes that these features are similar to the features discussed above with respect to claim 5. Therefore, Appellant's arguments made above with respect to claim 5 are incorporated by reference herein.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 11.

Therefore, the Board is respectfully requested to withdraw this rejection.

4. Independent Claim 15

Independent claim 15 recites:

"DNA comprising:

a first portion comprising a predetermined gene;

a second portion which is other than said first portion; and

09/870,009
JP920000069US1

at least one nucleotide sequence which is not naturally occurring in said DNA and is embedded in said second portion, and which identifies a source of said predetermined gene in said first portion" (emphasis added)

Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, Arnot clearly does not teach or suggest "*at least one nucleotide sequence which is not naturally occurring in said DNA and is embedded in said second portion, and which identifies a source of said predetermined gene in said first portion* " as recited in claim 15.

Appellant notes that these features are similar to the features discussed above with respect to claim 5. Therefore, Appellant's arguments made above with respect to claim 5 are incorporated by reference herein.

Therefore, Appellant respectfully submits that Lizardi clearly does not teach or suggest each and every element of the claimed invention as recited in claim 15.

Therefore, the Board is respectfully requested to withdraw this rejection.

5. Dependent Claim 9

Claim 9 depends from claim 8 and further recites "*wherein said at least one special sequence comprises a plurality of sequences embedded at predetermined locations of said DNA* ". This feature is discussed in the present Application at page 8, lines 6-16; page 26, line 14-page 27, line 12.

The Examiner asserts that this feature is disclosed by Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 9. Therefore, the Board is respectfully requested to withdraw this rejection.

6. Dependent Claim 10

31

09/870,009
JP920000069US1

Claim 10 depends from claim 8, and further recites "*wherein said at least one special sequence comprises a plurality of sequences having a plurality of types of patterns embedded at predetermined locations of said DNA*". This feature is discussed in the present Application at page 8, lines 6-16; page 26, line 14-page 27, line 12.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 10. Therefore, the Board is respectfully requested to withdraw this rejection.

7. Dependent Claim 17

Claim 17 depends from claim 15 and further recites "*wherein said predetermined gene comprises a value-added gene that is provided by one of selective breeding, cultivation, and gene manipulation*". This feature is discussed in the present Application at page 11, lines 9-12.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 17. Therefore, the Board is respectfully requested to withdraw this rejection.

8. Dependent Claim 18

Claim 18 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence comprises a plurality of sequences having a plurality of types of patterns embedded at predetermined locations in said second portion*".

This feature is discussed in the present Application at page 8, lines 6-16; page 26, line

09/870,009
JP920000069US1

14-page 27, line 12.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 18. Therefore, the Board is respectfully requested to withdraw this rejection.

9. Dependent Claim 19

Claim 19 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence comprises a plurality of nucleotide sequences*". This feature is discussed in the present Application at page 8, lines 6-16; page 26, line 14-page 27, line 12.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 19. Therefore, the Board is respectfully requested to withdraw this rejection.

10. Dependent Claim 20

Claim 20 depends from claim 19 and further recites "*wherein said plurality of nucleotide sequences comprises different nucleotide sequences*". This feature is discussed in the present Application at page 8, lines 6-16; page 24, lines 6-19.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest

09/870,009
JP920000069US1

each and every element of the claimed invention as recited in claim 20. Therefore, the Board is respectfully requested to withdraw this rejection.

11. Dependent Claim 21

Claim 21 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence is copy tolerant*". This feature is discussed in the present Application at page 14, lines 2-10.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 21. Therefore, the Board is respectfully requested to withdraw this rejection.

12. Dependent Claim 22

Claim 22 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence is embedded at a random location in said second portion*". This feature is discussed in the present Application at page 20, lines 6-14.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 22. Therefore, the Board is respectfully requested to withdraw this rejection.

13. Dependent Claim 23

Claim 23 depends from claim 15 and further recites "*wherein said at least one*

09/870,009
JP920000069US1

nucleotide sequence and is not naturally generated through gene mutation". This feature is discussed in the present Application at page 11, lines 9-21.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 23. Therefore, the Board is respectfully requested to withdraw this rejection.

14. Dependent Claim 24

Claim 24 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence comprises one of a restrictive enzyme identification sequence and a promoter*". This feature is discussed in the present Application at page 22, lines 15-21.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 24. Therefore, the Board is respectfully requested to withdraw this rejection.

15. Dependent Claim 25

Claim 25 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence is detectable using a nucleotide sequence that is complementary to said at least one nucleotide sequence*". This feature is discussed in the present Application at page 29, lines 4-21.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a

09/870,009
JP920000069US1

matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 25. Therefore, the Board is respectfully requested to withdraw this rejection.

16. Dependent Claim 26

Claim 26 depends from claim 15 and further recites "*wherein said at least one nucleotide sequence is embedded at a predetermined location in said second portion*". This feature is discussed in the present Application at page 16, lines 22-27.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 26. Therefore, the Board is respectfully requested to withdraw this rejection.

17. Dependent Claim 27

Claim 27 depends from claim 15 and further recites "*wherein said nucleotide sequence is correlated with said source identification information*". This feature is discussed in the present Application at page 7, line 10-page 8, line 5.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 27. Therefore, the Board is respectfully requested to withdraw this rejection.

09/870,009
JP920000069US1

18. Dependent Claim 30

Claim 30 depends from claim 5 and further recites "*wherein said nucleotide sequence comprises a watermark sequence*". This feature is discussed in the present Application at page 11, lines 1-10.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 30. Therefore, the Board is respectfully requested to withdraw this rejection.

19. Dependent Claim 34

Claim 34 depends from claim 5 and further recites "*wherein said gene portion is transcribed into RNA, and said portion other than said gene portion is not transcribed into RNA*". This feature is discussed in the present Application at page 13, lines 1-16.

The Examiner asserts that this feature is disclosed in Arnot.

However, Appellant respectfully submits that the Examiner's position is flawed as a matter of fact and as a matter of law. Specifically, nowhere in the cited passage, or anywhere else for that matter, does the reference teach or suggest this feature.

Therefore, Appellant respectfully submits that Arnot clearly does not teach or suggest each and every element of the claimed invention as recited in claim 34. Therefore, the Board is respectfully requested to withdraw this rejection.

Therefore, in short, the dependent claims of the present Application define elements and limitations which further place the claimed invention squarely in the realm of statutory subject matter and which provide a useful, tangible and concrete result.

Therefore, dependent claims like independent claims 5, 8, 11, 12 and 15, include at least one element which is not taught or suggested by the cited references, or any combination

37

09/870,009
JP920000069US1

of the cited references.

In view of all of the foregoing, Appellant respectfully submits that the Examiner's rejections are erroneous as a matter of fact and law

VIII. CONCLUSION

In view of the foregoing, Appellant submits that claims 5, 8-12, 15, 17-27 and 30-34, all the claims presently pending in the application, are patentably distinct from the prior art of record and in condition for allowance. Thus, the Board is respectfully requested to remove the rejections of claims 5, 8-12, 15, 17-27 and 30-34.

Please charge any deficiencies and/or credit any overpayments necessary to enter this paper to Assignee's Deposit Account number 50-0510.

Respectfully submitted,



Phillip E. Miller
Reg. No. 46,060

Dated: 6/26/06

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09/870,009
JP920000069US1

CLAIMS APPENDIX

1-4. (Canceled)

5. DNA having embedded information, comprising:
a gene portion including a predetermined gene;
a portion which is other than said gene portion; and
a nucleotide sequence which is not naturally occurring in said DNA and which is embedded in said portion which is other than said gene portion, and comprises source identification information which identifies a source of said predetermined gene in said gene portion.

6-7. (Canceled)

8. DNA comprising:
at least one special sequence which is not naturally occurring in said DNA and that is intentionally designed and is included as a part of a nucleotide sequence,
wherein said at least one special sequence comprises source identification information which identifies the source of a predetermined gene which is included in a gene portion of said DNA, and
wherein said at least one special sequence is embedded in said DNA.

9. The DNA according to claim 8, wherein said at least one special sequence comprises a plurality of sequences embedded at predetermined locations of said DNA.

10. The DNA according to claim 8, wherein said at least one special sequence comprises a plurality of sequences having a plurality of types of patterns embedded at predetermined locations of said DNA.

11. A nucleotide sequence in DNA, comprising:
source identification information which identifies a source of a predetermined gene in

09/870,009
JP920000069US1

a gene portion of said DNA,

wherein said information is embedded in said DNA and is not naturally occurring in said DNA.

12. A cell in an organism, said cell having DNA comprising:
- a gene portion including a predetermined gene;
 - a portion which is other than said gene portion; and
 - a nucleotide sequence which is not naturally occurring in said DNA and which is embedded in said portion other than said gene portion, and comprises source identification information which identifies a source of said predetermined gene in said gene portion.

13-14. (Canceled)

15. DNA comprising:
- a first portion comprising a predetermined gene;
 - a second portion which is other than said first portion; and
 - at least one nucleotide sequence which is not naturally occurring in said DNA and is embedded in said second portion, and which identifies a source of said predetermined gene in said first portion.

16. (Canceled)

17. The DNA according to claim 15, wherein said predetermined gene comprises a value-added gene that is provided by one of selective breeding, cultivation, and gene manipulation.

18. The DNA according to claim 15, wherein said at least one nucleotide sequence comprises a plurality of sequences having a plurality of types of patterns embedded at predetermined locations in said second portion.

19. The DNA according to claim 15, wherein said at least one nucleotide sequence

40

09/870,009
JP920000069US1

comprises a plurality of nucleotide sequences.

20. The DNA according to claim 19, wherein said plurality of nucleotide sequences comprises different nucleotide sequences.

21. The DNA according to claim 15, wherein said at least one nucleotide sequence is copy tolerant.

22. The DNA according to claim 15, wherein said at least one nucleotide sequence is embedded at a random location in said second portion.

23. The DNA according to claim 15, wherein said at least one nucleotide sequence and is not naturally generated through gene mutation.

24. The DNA according to claim 15, wherein said at least one nucleotide sequence comprises one of a restrictive enzyme identification sequence and a promoter.

25. The DNA according to claim 15, wherein said at least one nucleotide sequence is detectable using a nucleotide sequence that is complementary to said at least one nucleotide sequence.

26. The DNA according to claim 15, wherein said at least one nucleotide sequence is embedded at a predetermined location in said second portion.

27. The DNA according to claim 15, wherein said nucleotide sequence is correlated with said source identification information.

28.- 29.(Canceled)

30. The DNA according to claim 5, wherein said nucleotide sequence comprises a

41

09/870,009

JP920000069US1

watermark sequence.

31. The DNA according to claim 5, wherein said predetermined gene comprises a protein code sequence and transcription control information for said sequence.

32. The DNA according to claim 5, wherein said portion which is other than said gene portion comprises a portion of said DNA which does not store a protein code sequence and transcription control information for said sequence.

33. The DNA according to claim 5, wherein said predetermined gene comprises a gene which is produced by artificial, intentional manipulation.

34. The DNA according to claim 5, wherein said gene portion is transcribed into RNA, and said portion other than said gene portion is not transcribed into RNA.

42

09/870,009
JP920000069US1

EVIDENCE APPENDIX

none

RELATED PROCEEDINGS APPENDIX

none

43

09/870,009
JP920000069US1

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing Appeal Brief was filed by facsimile with the United States Patent and Trademark Office, Examiner Carolyn Smith, Group Art Unit # 1631 at fax number 571-272-8300 this 26th day of June, 2006.



Phillip E. Miller, Esq.

Reg. No. 46,060

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